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Page 1 of: 23

Attention: MAIL STOP APPEAL BRIEF
Group Art Unit 2613
Examiner Li, Shi K.

From: SMART & BIGGAR

Your file no.: 10/067,910

Reply to Ottawa file no.: 78848-33 /jas

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First Named Inventor	BOERTJES, David W. et al.
Art Unit	2613
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- [x] Other Enclosure(s) (please identify below):

1. Appellant's Brief Under 37 CFR 41.37 in response to the Notice of Non-Compliant Appeal Brief dated February 1, 2007 (see below)

Remarks

The Patent Office is requested to note that the required Notice of Appeal fee in the amount of $500 USD and the fee for filing the Brief on Appeal in the amount of $500 USD were previously submitted with our correspondence dated October 13, 2006. Accordingly, no fee is required for this submission.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	SMART & BIGGAR		
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/067,910
Applicant	:	David Boertjes, et al
Filed	:	February 8, 2002
TC/A.U.	:	2613
Examiner	:	Li, Shi K.
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Dear Sir:

APPELLANT'S BRIEF UNDER 37 C.F.R. 41.37

The following is the Appellant's Brief, submitted under the provisions of 37 C.F.R. 41.37. The fee of $500 that is required by 37 C.F.R. 41.20(b)(1) for filing a Notice of Appeal is enclosed. The fee of $500 that is required by 37 C.F.R. 41.20(b)(2) for filing a brief in support of the appeal is enclosed.

Real Party in Interest

The real party in interest is the assignee of record, i.e. Nortel Networks Limited, current address 2351 Boulevard Alfred-Nobel, St. Laurent, Quebec, Canada, H4S 2A9.

Related Appeals and Interferences

There are no related appeals or interferences that will directly affect, be directly affected by, or have a bearing on the present appeal.

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Status of Claims

Claims 1-3, 15 and 39-44 are currently pending in the application. Claims 4-14 and 16-38 have been previously cancelled.

An Appendix containing a copy of the appealed claims is attached hereto.

Status of Amendments

Claims 1-3 and 15 were elected in an Office Action response filed on October 20, 2005 in response to a restriction requirement dated September 20, 2005.

Claims 39 to 44 were added in an Office Action response filed on March 13, 2006. Claims 1 and 15 were amended and withdrawn claims 4-14 and 16-38 were cancelled in the same Office Action response.

The response of March 13, 2006 was considered by the Examiner, but deemed not to be persuasive, as discussed in detail in the Final Office Action issued by the Examiner dated April 13, 2006.

Claim 44 was amended in a response to the Final Office Action filed on August 9, 2006.

Accordingly, it is Applicant's understanding that the claims presently on file correspond to the listing of claims filed in the Office Action response dated August 9, 2006.

The response of August 9, 2006 was considered by the Examiner, but deemed not to place the application in condition for allowance, as discussed in an Advisory Action issued by the Examiner dated August 29, 2006.

Summary of Claimed Subject Matter

The invention as recited in independent claim 1 relates to "A method of monitoring cross-talk, at a point in an optical system, arising at least in part from a non-linear process in a transmission medium utilized in the optical system, in a multiplexed optical signal having a plurality of channels upon one or more of which has been impressed, at another point in the

optical system, a unique dither". An example of an optical network in which the method can be applied, where each channel of a multiplexed optical signal is impressed with a unique dither is described in the Background section on page 1, lines 14-18. Another example of an optical network in which the method can be applied, where at least one channel of a multiplexed optical signal is impressed with a unique dither of is described on page 12, lines 8-14. A further example is described in which the multiplexed optical signal has N channels and each channel has a unique AM tone representing the unique dither at page 12, lines 14-17. However, as stated on page 12, lines 22, "embodiments of the invention are not limited to having all channels of the multiplexed optical signal impressed with a unique dither". On page 16, lines 3-6, a multiplexed optical signal carrying N channels is described propagating along an optical fibre 10 already having a unique dither on each of the N channels prior to arriving at the optical line amplifier 5 of Figure 1. Different types of dithers that could be impressed are described on page 16, lines 18-27. On page 2, lines 19-23, the description states that the "optical apparatus measures power transfer coefficients arising from a non-linear process <u>in the transmission medium</u>" (emphasis added). Furthermore, on page 12, lines 18-20, the description states that "cross-talk mediated by SRS or other non-linear processes result in transfer of AM tones from one channel to another". Page 3, line 26 to page 4, line 13 of the application described a method consistent with claim 1.

The method of claim 1 also recites "determining channel power of at least one channel of the plurality of channels". An example of determining the channel power of at least one of the plurality of channels is described at page 18, lines 16-23 with reference to Figure 1, in which multiplexed optical signal OSA3 propagates to OSA 230 and "for each channel of the multiplexed optical signal OSA3 the OSA 230 measures an indicator of the channel power P_j, (j=1 to N where N is the number of channels) of the multiplexed optical signal".

Claim 1 also recites a step of "determining a fractional power of any dither present upon the at least one channel resulting at least in part from the non-linear process in the transmission medium". An example of determining fractional power of any dither present upon the at least one channel is described at page 18, lines 23-26 with reference to Figure 1, in which multiplexed optical signal OSA3 propagates to OSA 230 and "the OSA 230 also measures an indicator of a fractional power $\beta_{ij}P_j$, of AM tone i present upon channel j of the multiplexed optical signal (the

power $\beta_{ij}P_j$, is a fraction of the power AM)". On page 2, lines 19-23, the description states that the "optical apparatus measures power transfer coefficients arising from a non-linear process <u>in the transmission medium</u>" (emphasis added). Furthermore, on page 12, lines 18-20, the description states that "cross-talk mediated by SRS or other non-linear processes result in transfer of AM tones from one channel to another".

The method of claim 1 further recites "determining a power transfer coefficient from the fractional power and the channel power of the at least one channel, the power transfer coefficient indicative of cross-talk occurring on the at least one channel from any of the plurality of channels upon which the unique dither has been impressed, the cross-talk due at least in part to the non-linear process in the transmission medium". An example of determining a power transfer coefficient is described at page 19, lines 1-4, in which a control circuit calculates the power transfer coefficient, β_{ij}, using $\beta_{ij}=\beta_{ij}P_j / P_j$, where $\beta_{ij}P_j$ is the fractional power and P_j is the channel power of the at least one channel. On page 2, lines 19-23, the description states that the "optical apparatus measures power transfer coefficients arising from a non-linear process <u>in the transmission medium</u>" (emphasis added). Furthermore, on page 12, lines 18-20, the description states that "cross-talk mediated by SRS or other non-linear processes result in transfer of AM tones from one channel to another".

Claim 2 is dependent upon claim 1. Claim 2 recites "the power transfer coefficient is determined from an equation $\beta_{ij} = (\beta_{ij}P_j)/P_j$ wherein β_{ij} is the power transfer coefficient, P_j is the power of a channel, j, corresponding to the at least one channel and $\beta_{ij}P_j$ is the fractional power of a dither, i, corresponding to the dither present upon the at least one channel". An example of this additional limitation described in the application is discussed above with regard to the step in claim 1 of "determining the power coefficient".

Claim 3 is dependent upon claim 1. Claim 3 recites "A method of controlling output characteristics of the multiplexed optical signal comprising the method of claim 1 and further comprising providing instructions for controlling the power transfer coefficient". Such a limitation is described on page 4, lines 13-16 of the present application with regard to a method consistent with claim 1.

Independent claim 15 relates to "An optical apparatus adapted to monitor cross-talk, at a point in an optical system, arising at least in part from a non-linear process in a transmission medium utilized in the optical system, in a multiplexed optical signal having a plurality of channels upon one or more of which has been impressed, at another point in the optical system, a unique dither". Such an optical system in which the optical apparatus is used is discussed above with regard to claim 1. Page 7, line 21 to page 8, line 3 of the application described an optical apparatus consistent with the claim. Particular examples of the optical apparatus are described with regard to Figures 1, 2A and 2B. A description of the optical apparatus of Figure 1 and its operation for determining a power transfer coefficient is located on page 14, line 13 to page 19, line 4.

A recited element of the optical apparatus of claim 15 is "an OSA (Optical Spectrum Analyzer) adapted to measure an indicator of channel power of at least one channel of the plurality of channels and to measure an indicator of a fractional power of any dither present upon the at least one channel resulting at least in part from the non-linear process in the transmission medium". With respect to Figures 1, 2A and 2B, OSA 230 is described as measuring an indicator of channel power of at least one channel of the plurality of channels and to measure an indicator of a fractional power of any dither present upon the at least one channel at page 12, lines 16-26. As described above with respect to claim 1, the transfer of a dither on a particular channel to other channels can be a result of non-linear processes such as SRS, occurring in the transmission medium.

Another recited element of the optical apparatus of claim 15 is "a control circuit adapted to determine a power transfer coefficient from the fractional power and the channel power of the at least one channel, the power transfer coefficient indicative of cross-talk occurring on the at least one channel from any of the plurality of channels upon which the unique dither has been impressed, the cross-talk due at least in part to the non-linear process in the transmission medium". With respect to Figures 1, 2A and 2B, control circuit 370 is described as being used to determine a power transfer coefficient from the fractional power and the channel power of the at least one channel at page at page 19, lines 1-4. As described above with respect to claim 1, the transfer of a dither on a particular channel to other channels can be a result of non-linear

processes such as SRS, occurring in the transmission medium.

Claim 39 is a method claim dependent upon claim 1 with an additional limitation that "a non-linear process in a transmission medium comprises stimulated Raman scattering". On page 2, lines 19-23, the description states that the "optical apparatus measures power transfer coefficients arising from a non-linear process in the transmission medium, such as SRS".

Claim 40 is dependent upon claim 15. Dependent claim 40 recites features that are substantially similar to those recited in claim 39, which have been discussed above.

Claim 41 is dependent on claim 1 and recites the additional limitation that "at least one of the plurality of channels of the multiplexed optical signal is impressed with a plurality of dithers to provide wave identification (WID) information". Examples of such a limitation are described on page 1, lines 21-23, page 6, lines 15-18 and page 16, lines 14-17.

Claim 42 is dependent on claim 15 and recites the additional limitation that "the indicator of the fractional power, $\beta_{ij}P_j$, and the indicator of the channel power, P_j, are voltages and one of the OSA and the control circuit is adapted convert the voltages into powers". An example of the additional limitation of claim 42 is described on page 18, lines 26-29.

Claim 43 is dependent upon claim 15. Dependent claim 43 recites features that are substantially similar to those recited in claim 41, which have been discussed above.

Claim 44 is dependent on claim 15 and recites the additional limitation of the optical apparatus including "a plurality of basic functional components which are optical devices, wherein the plurality of basic functional components include one or more of a group consisting of at least one optical tap, at least one PIN detector, at least one erbium-doped fiber amplifier (EDFA), at least one dynamic gain flatten filter (DGFF), and at least one dispersion compensation module (DCM)". Optical devices such as optical taps, PIN detectors, EDFAs, DGFFs, and DCMs are included in the embodiments of Figures 1, 2A and 2B. A detailed description of the example of Figure 1 is located on page 14, line 13 to page 16, line 2.

Grounds of Rejection to be reviewed on appeal

The issues which are hereby presented for review are as follows:

1. whether claims 1-3, 15, 39-40, 42 and 44 are unpatentable under 35 U.S.C. 103(a) over non-patent reference "Method for Crosstalk Measurement and Reductions in Dense WDM Systems", Journal of Lightwave Technology, Vol. 14, No. 6, June 1996 by K. Ho in view of non-patent reference "Estimation of the SRS Crosstalk on Pilot tones in WDM Systems using a Dither Transfer Matrix", S. Seynejad et al, OFC 2001, 17-22 March 2001; and

2. whether claims 41 and 43 are unpatentable under 35 U.S.C. 103(a) over Ho in view of Seynejad, and further in view of United States Patent No. 5,892,606 (Fatehi *et al.*).

Arguments

The requirements for establishing a *prima facie* case of obviousness as set out in the MPEP Section 2143.01 require that the reference or references when combined teach all of the claimed limitations, that there be a reasonable expectation of success in realizing the claimed invention, and that there be a motivation to combine the references.

1. Whether claims 1-3, 15, 39-40, 42 and 44 are unpatentable under 35 U.S.C. 103(a) over non-patent reference "Method for Crosstalk Measurement and Reductions in Dense WDM Systems", Journal of Lightwave Technology, Vol. 14, No. 6, June 1996 by K. Ho in view of non-patent reference "Estimation of the SRS Crosstalk on Pilot tones in WDM Systems using a Dither Transfer Matrix", S. Seynejad et al, OFC 2001, 17-22 March 2001.

The references do not suggest the claimed subject matter

With respect to claim 1, the Examiner alleges on page 3 of the Final Office Action dated April 13, 2006 that Figure 1 in the Ho reference teaches a cross-talk monitoring scheme which includes a multiplexed optical signal comprising wavelength channels $\lambda_1,\ldots \lambda_i,\ldots\lambda_N$ wherein each channel is impressed with a dither frequency f_i.

Ho discloses that the power of each channel and the power of the dither tones are detected

after the multiplexed signal is demultiplexed by the grating-based demultiplexer. This is disclosed on page 1127, second column, first paragraph of Section II "Crosstalk Monitoring", "we propose to use an array of detectors to detect several adjacent channels, weight them, and combine them with the desired channel". The illustration in Figure 1 shows the grating-based demultiplexer demultiplexing the multiplexed optical signal transmitted on the "Optical Link of Network" and directing different wavelengths to respective detectors and also coupling the different wavelengths to a tone power monitor. Therefore, Ho clearly discloses demultiplexing a multiplexed optical signal before steps such as determining channel power and determining dither power would be performed. Even if such determining steps are performed in Ho, Applicant does not concede they are performed in the same manner as the steps recited in claim 1.

Claim 1 of the present application recites "A method of monitoring cross-talk, at a point in an optical system, arising at least in part from a non-linear process in a transmission medium utilized in the optical system, in a multiplexed optical signal having a plurality of channels" (emphasis added). In the claims of the present application there is no indication that the multiplexed optical signal is demultiplexed prior to the steps of "determining channel power of at least one channel of the plurality of channels; determining a fractional power of any dither present upon the at least one channel resulting at least in part from the non-linear process in the transmission medium; and determining a power transfer coefficient". On page 3, lines 27-30 of the present application, a method is described for "monitoring cross-talk in a multiplexed optical signal". An example of how the power and the dither of at least one channel of the multiplexed optical signal can be monitored is described on page 7, line 27 to page 8, line 3 of the present application, where the application states an OSA (optical spectrum analyzer) is used "to measure an indication of channel power of at least one channel of the plurality of channel".

Ho discloses monitoring linear cross-talk arising from demultiplexing of a signal after it has been demultiplexed by the grating-based demultiplexer, which is different than what is recited in the claims of the present application.

Seynejad does not specifically disclose if channel powers and dithers are determined from the channels of a multiplexed optical signal or demultiplexed signals of a formerly multiplexed

signal, but discloses mathematical tools to aid in "compensating for the performance of degradation arising from SRS on pilot-tone optical monitoring" (abstract of Seynejad).

Thus, the recited features of claim 1 are not all disclosed by the cited references, either alone or in combination, and it is submitted that the Examiner has failed to satisfy a first necessary criterion for establishing a *prima facie* case of obviousness.

Expectation of Success

With regard to the second requirement for establishing a *prima facie* case of obviousness, Applicant submits that there would be little chance of success in arriving at the claimed invention in combining Ho and Seynejad because Ho demultiplexes the optical signal and Seynejad does not specifically disclose if channel powers and dithers are determined from the channels of a multiplexed optical signal or demultiplexed signals of a formerly multiplexed signal. Without disclosing all the features of claim 1, it is not reasonable to expect the combination of references would be successful in arriving at the claimed invention, especially in view of the fact that the Examiner has not provided an explanation of how the missing feature would be obvious. As a result, Applicant submits that the Examiner has failed to satisfy a second necessary criterion for establishing a *prima facie* case of obviousness.

Motivation to combine references

According to The Manual of Patent Examining Procedure, Section 2143.01 "there are three possible sources for a motivation to combine references: the natures of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art". It is respectfully submitted that the Examiner has not established a motivation to combine the references from any of the three sources.

With regard to the first source for a motivation to combine, Applicant submits that the nature of the problem to be solved by the reference is not the same. Ho teaches a method "for the monitoring and reduction of cross-talk arising from the limited stop-band rejection of optical bandpass filters in dense WDM systems" (abstract). Seynejad discloses a "tool for compensating for the performance degradation arising from SRS on pilot-tone optical monitoring" (abstract).

Applicant submits that these are two different problems with different solutions. Ho deals with monitoring linear cross-talk related to a discrete optical component involved in demultiplexing an optical signal and Seynejad deals with compensating degradation arising from non-linear cross-talk in the transmission medium.

With regard to the second source for a motivation to combine, Applicant submits that neither of the two pieces of cited art suggest the subject matter of the other piece of prior art in a manner that would lead one skilled in the art to arrive at the claimed invention by a review of the two references. In addition, neither reference refers to each other. As was clearly stated *In re Kotzah*, 55 USPQ2d 1313, 1318 "Identification of prior art statements that, in abstract, appear to suggest claimed limitation does not establish prima facie obviousness without a finding as to specific understanding or principle within knowledge of skilled artisan that would have motivated one with no knowledge of invention at issue to make combination <u>in manner claimed</u>" (emphasis added). Applicant respectfully submits that monitoring linear cross-talk in a demultiplexed signal that results from the demultiplexer is not the same as monitoring non-linear cross-talk while the optical signal is still a multiplexed signal and the non-linear cross-talk results from the transmission medium. The Examiner has not provided clear motivation for why it would be obvious for someone desiring to monitor non-linear cross-talk in an optical signal that is still multiplexed to utilize a scheme for monitoring linear cross-talk in demultiplexed signals, where the linear cross-talk is caused by a grating demultiplexer that demultiplexes the signal. Applicant submits that the Examiner's selection of references is a prime example of "identification of prior art statements that, in abstract, appear to suggest claimed limitation" but clearly do not result in the invention <u>in the manner claimed</u>.

With regard to the third source for a motivation to combine, Applicant submits that the Examiner has failed to show motivation based on the knowledge of persons of ordinary skill in the art. The Examiner's statement that "one of ordinary skill in the art would have been motivated to combine the teachings of Seydnejad with the cross-talk monitoring scheme of Ho because measuring cross-talk caused by SRS helps engineering transmission systems" does not provide a suitable motivation based on the knowledge of persons of ordinary skill in the art to achieve the claimed invention. Applicant submits that the Examiner has not shown that one

skilled in the art would have the knowledge of monitoring non-linear cross-talk in a multiplexed optical signal based on having the knowledge of monitoring linear cross-talk in a demultiplexed optical signal resulting from the demultiplexer performing the demultiplexing. Applicant submits that the Examiner has failed to satisfy the third source for a motivation to combine the references.

Furthermore, Applicant submits that using Ho to monitor non-linear cross-talk in a multiplexed optical signal would change the principle of the operation of system described in Ho. A fundamental aspect of what Ho is disclosing is the monitoring of linear cross-talk in a demultiplexed signal that results from the demultiplexer performing the demultiplexing. If the optical signal remains multiplexed when the steps of "determining channel power of at least one channel of the plurality of channels; determining a fractional power of any dither present upon the at least one channel resulting at least in part from the non-linear process in the transmission medium; and determining a power transfer coefficient" as recited in claim 1, there would be no linear cross-talk resulting from the demultiplexer, because no demultiplexer is used. Applicant submits that this is another reason why there would be no motivation to combine the Ho and Seynejad.

Applicant submits that the Examiner has failed to satisfy a third necessary criterion for establishing a *prima facie* case of obviousness, namely motivation to combine the references.

For at least the reasons discussed above with regard to the necessary criteria for establishing a *prima facie* case of obviousness, Applicant submits that there is a clear deficiency in establishing such a *prima facie* case of obviousness with respect to claim 1.

Claims 2, 3 and 39 are dependent upon claim 1. As claim 1 patentably distinguishes over the cited references for at least the reasons discussed above, Applicant submits that claims 2, 3 and 39 are patentable as well. For at least the above-discussed reasons it is submitted that there is a clear deficiency in establishing a *prima facie* case of obviousness with respect to claims 2, 3 and 39.

Claim 15 is an apparatus claim directed to similar subject matter of claim 1. Claim 15 in particular recites "an OSA (Optical Spectrum Analyzer) adapted to measure an indicator of channel power of at least one channel of the plurality of channels". Claim 15 is directed to an

apparatus for monitoring cross-talk in a multiplexed optical signal, not demultiplexed optical signals that were formerly part of a multiplexed optical signal as disclosed in Ho. For this reason and at least the other reasons discussed above with regard to claim 1, Applicant submits that claim 15 patentably distinguishes over the cited references.

Claims 40, 42 and 44 depend on claim 15. As claim 15 patentably distinguishes over the cited references for at least the reasons discussed above, Applicant submits that claims 40, 42 and 44 are patentable as well. For at least the above-discussed reasons it is submitted that there is a clear deficiency in establishing a *prima facie* case of obviousness with respect to claims 40, 42 and 44.

Furthermore with regard to claim 44, the Examiner objected to claim 44 in the Office Action dated April 13, 2006. The Examiner alleged that the meaning of "basic functional component" is unclear. Applicant amended claim 44 for the sake of clarity to include a list of "basic functional components" in the Office Action response filed on August 9, 2006. As claim 44 is dependent upon an allowable claim as discussed above and identifies a list of "basic functional components", Applicant submits that claim 44 is non-obvious with respect to the cited references.

<u>2. Whether claims 41 and 43 are unpatentable under 35 U.S.C. 103(a) over Ho in view of Seynejad, and further in view of United States Patent No. 5,892,606 (Fatehi *et al.*).</u>

Claim 41 depends on claim 1 and claim 43 depends on claim 15. Claims 41 and 43 should be allowed for the same reasons as discussed above with reference to claims 1 and 15. In particular, Ho and Seynejad fail to disclose all of the claimed features of claims 1 and 15, respectively. Applicant submits that the Fatehi reference also fails to disclose the features of claims 1 and 15 that Ho and Seynejad fail to disclose, namely monitoring non-linear cross-talk of a multiplexed optical signal.

In addition, Applicant submits that the Examiner has failed to satisfy all the requirements of establishing a *prima facie* case of obviousness for the additional subject matter recited in claims 41 and 43, as will be discussed below.

The references do not suggest the claimed subject matter

Claims 41 and 43 depend from claims 1 and 15 respectively, and thus also include features which are not suggested by Ho and Seynejad. The features relied upon by the Examiner to be disclosed by Ho and Seynejad are not disclosed by either reference, as discussed in detail above, and Applicant further submits that the features are not taught by Fatehi. As illustrated in Figures 1 and 2 of Fatehi, the optical fibre is a single wavelength signal line, which is not used for a multiplexed optical signal. Even if the apparatus of Fatehi were used for an optical fibre having multiple carriers, there is no suggestion or disclosure in Fatehi of monitoring cross-talk resulting from a non-linear process in the optical fibre. Therefore, the combination of references does not teach all the limitations of the independent claims. This represents a further error in the rejection of the above appealed claims.

Motivation to combine references

As discussed in detail above, there is a lack of motivation to combine the teachings of the cited prior art of Ho and Seynejad in the manner suggested by the Examiner, which constitutes an error in the rejection of these claims. Furthermore, there is a lack of motivation to combine the references of Ho and Seynejad with Fatehi for the following reasons.

With regard to the first source for a motivation to combine, Applicant submits that the nature of the problem to be solved is not the same. The nature of the problems to be solved by Ho and Seynejad are described above. Fatehi is directed at adding a dither to an optical carrier modulated with an information signal. This is a different problem to be solved than either of the problems addressed by Ho and Seynejad.

With regard to the second source for a motivation to combine, Applicant submits that none of the three references suggest the subject matter of any of the other two references in a manner that would lead one skilled in the art to arrive at the claimed invention by a review of the three references. None of the three references refers to either of the other two. Furthermore, the respective prior art does not suggest, either alone or in combination the desirability of the claimed invention.

With regard to the third source for a motivation to combine, Applicant submits that the

Examiner has failed to show motivation based on the knowledge of persons of ordinary skill in the art. The Examiner's statement that "one of ordinary skill in the art would have been motivated to combine the teaching of Fatehi et al with the modified cross-talk monitoring scheme of Ho et al and Seynejad et al because using a plurality of tones reduces the number of different tones needed for tagging a given number of wavelengths and reduces cost" does not provide any clear indication of the particular knowledge that one skilled in the art would have at the time of the invention that would motivate them to combine the three references, having different and unrelated subject matter.

For at least the above reasons Applicant submits that the cited references do not suggest all claimed subject matter and there is a lack of motivation to combine the references. Therefore, all the requirements for establishing a *prima facie* case of obviousness have clearly not been met, thus constituting a further error in the rejection of the appealed claims.

Response to the Advisory Action

In the Advisory Action issued on August 29, 2006, the Examiner responds to Applicant's arguments submitted in the Office Action response filed August 9, 2006. In response to Applicant's argument that Ho discloses a system in which a multiplexed optical signal is demultiplexed before particular steps are performed and the claims of the present application recites steps that are performed on a multiplexed optical signal, the Examiner alleges that claim 1 does not exclude demultiplexing of the multiplexed optical signal before the steps of the method are performed. The Applicant strongly disagrees and submits that claim 1 clearly recites "a method of monitoring cross-talk ... in a multiplexed optical signal having a plurality of channels". Applicant again refers to the description at page 3, lines 27-30, in which a method is described to be used for "monitoring cross-talk in a multiplexed optical signal" (emphasis added).

Also in the Advisory Action in response to Applicant's argument that Ho does not teach detecting and compensating non-linear cross-talk, the Examiner alleges that nowhere in Ho is it disclosed that the cross-talk is linear. Applicant disagrees and submits that Ho discloses a system utilizing a grating-based demultiplexer, as is evident from Figure 1 and lines 3-5 of the second

column of page 1127 of Ho. At lines 7-8 of the second column of page 1127, Ho states "a grating-based demultiplexer induces only linear crosstalk" (emphasis added). Ho describes non-linear cross-talk cancellation, but this is non-linear cancellation techniques of linear cross-talk, as indicated in the description of Figure 4 on page 1131 of Ho.

In the Advisory Action, the Examiner also states that the claim language does not recite non-linear cross-talk and nowhere in the specification is linear and non-linear cross-talk defined. The claim language recites "cross-talk … arising at least in part from a non-linear process in a transmission medium". Applicant submits that one skilled in the art would understand that "a non-linear process in the transmission medium" results in non-linear cross-talk between channels. On page 12, lines 18 to 22 of the present application, the description states "cross-talk mediated by SRS or other non-linear processes results in transfer from one channel to another". Furthermore, Applicant submits that the concepts of linear and non-linear cross-talk would be known to one skilled in the art.

In the Advisory Action, the Examiner states Applicant's amendment to claim 44 filed on August 9, 2006 changes the scope of claim 44 and states the claim would require further consideration and/or search. Applicant submits that claim 44 is allowable for the reasons discussed above and therefore would not require further consideration and/or search.

Conclusions

With respect to each of the issues presented herein for review, Applicant respectfully submits that errors have been made in the rejection of the appealed claims. A *prima facie* case of obviousness has not been established.

Regarding the issue of whether claims 1-3, 15, 39-40, 42 and 44 are unpatentable under 35 U.S.C. 103(a) over non-patent reference "Method for Crosstalk Measurement and Reductions in Dense WDM Systems", Journal of Lightwave Technology, Vol. 14, No. 6, June 1996 by K. Ho in view of non-patent reference "Estimation of the SRS Crosstalk on Pilot tones in WDM Systems using a Dither Transfer Matrix", S. Seynejad et al., OFC 2001, 17-22 March 2001,

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Applicant respectfully requests that the rejection of these claims be reconsidered by the Board and withdrawn.

Regarding the issue of whether claims 41 and 43 are unpatentable under 35 U.S.C. 103(a) over Ho in view of Seynejad, and further in view of United States Patent No. 5,892,606 (Fatehi *et al.*), Applicant respectfully requests that the rejection of these claims be reconsidered by the Board and withdrawn.

Respectfully submitted,
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JMC:CNG:MSS:mcg:slr

Claims Appendix

1. (Previously presented) A method of monitoring cross-talk, at a point in an optical system, arising at least in part from a non-linear process in a transmission medium utilized in the optical system, in a multiplexed optical signal having a plurality of channels upon one or more of which has been impressed, at another point in the optical system, a unique dither, the method comprising:

determining channel power of at least one channel of the plurality of channels;

determining a fractional power of any dither present upon the at least one channel resulting at least in part from the non-linear process in the transmission medium; and

determining a power transfer coefficient from the fractional power and the channel power of the at least one channel, the power transfer coefficient indicative of cross-talk occurring on the at least one channel from any of the plurality of channels upon which the unique dither has been impressed, the cross-talk due at least in part to the non-linear process in the transmission medium.

2. (Original) A method according to claim 1 wherein the power transfer coefficient is determined from an equation $\beta_{ij} = (\beta_{ij}P_j)/P_j$ wherein β_{ij} is the power transfer coefficient, P_j is the power of a channel, j, corresponding to the at least one channel and $\beta_{ij}P_j$ is the fractional power of a dither, i, corresponding to the dither present upon the at least one channel.

3. (Original) A method of controlling output characteristics of the multiplexed optical signal comprising the method of claim 1 and further comprising providing instructions for controlling the power transfer coefficient.

4. - 14. (Cancelled)

15. (Previously presented) An optical apparatus adapted to monitor cross-talk, at a point in

an optical system, arising at least in part from a non-linear process in a transmission medium utilized in the optical system, in a multiplexed optical signal having a plurality of channels upon one or more of which has been impressed, at another point in the optical system, a unique dither, the apparatus comprising:

an OSA (Optical Spectrum Analyzer) adapted to measure an indicator of channel power of at least one channel of the plurality of channels and to measure an indicator of a fractional power of any dither present upon the at least one channel resulting at least in part from the non-linear process in the transmission medium; and

a control circuit adapted to determine a power transfer coefficient from the fractional power and the channel power of the at least one channel, the power transfer coefficient indicative of cross-talk occurring on the at least one channel from any of the plurality of channels upon which the unique dither has been impressed, the cross-talk due at least in part to the non-linear process in the transmission medium.

16. - 38. (Cancelled)

39. (Previously presented) A method according to claim 1 wherein a non-linear process in a transmission medium comprises stimulated Raman scattering.

40 (Previously presented) An apparatus according to claim 15 wherein a non-linear process in a transmission medium comprises stimulated Raman scattering.

41. (Previously presented) A method according to claim 1 wherein at least one of the plurality of channels of the multiplexed optical signal is impressed with a plurality of dithers to provide wave identification (WID) information.

42. (Previously presented) An apparatus according to claim 15 wherein the indicator of the fractional power, $\beta_{ij}P_j$, and the indicator of the channel power, P_j, are voltages and one of the OSA and the control circuit is adapted convert the voltages into powers.

43. (Previously presented) An apparatus according claim 15 applied to a multiplexed optical signal wherein at least one channel of the plurality of channels having impressed a unique dither comprises at least one additional unique dither to provide WID.

44. (Previously presented) An apparatus according to claim 15 comprising a plurality of basic functional components which are optical devices, wherein the plurality of basic functional components include one or more of a group consisting of at least one optical tap, at least one PIN detector, at least one erbium-doped fiber amplifier (EDFA), at least one dynamic gain flatten filter (DGFF), and at least one dispersion compensation module (DCM).

Evidence Appendix

None

Related Proceedings Appendix

None